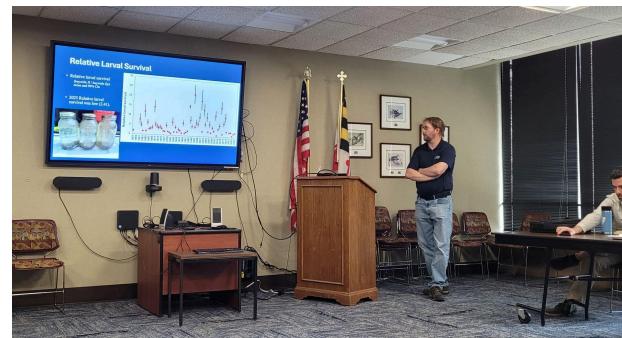


Fisheries Ecosystem Assessment Division
November 2025

Last Month

Larval Striped Bass Feeding Study - Work continues on processing Striped Bass and White Perch larvae collected from the spring Midwater Trawls. Of the 53 total samples and subsamples, 23 have been completed, and all but 10 are currently in progress. Just under 10,000 *Morone* larvae have been processed, with 1,331 Striped Bass and 5,240 White Perch. The remainder were outside our size ranges for feeding analysis and not identified to species.



An ambitious White Perch larva has a mouthful of copepod; Jeff Horne presents at Striped Bass Recruitment meeting.

Stomach Content Analysis for Striped Bass – Staff worked with Cooperative Oxford Laboratory (COL) to collect Striped Bass stomachs for forage analysis. Striped Bass were caught via hook and line and brought back to COL. Staff cut open stomachs to determine forage eaten by these fish. In November, the stomach contents of 135 Striped Bass were examined. Most prey items were Atlantic Menhaden and Blue Crabs. Unusually, seven fish had remains of Mantis Shrimp (*Squilla empusa*) in their stomachs, which have been previously recorded on only six occasions in the 13 year time series.

Striped Bass Recruitment Meeting - Staff attended a meeting with Striped Bass program biologists and FABS leadership to discuss results and observations from the 2025 season, as well as plan for the 2026 season. Jeff Horne presented data from the 2025 spring Striped Bass egg and larval work (pictured above) and Tred Avon River summer sampling.

Menhaden-Striped Bass Traffic Light Index - Staff worked with DNR communications staff on a press release.

Federal Aid Report – Staff began data analysis for the 2025 Federal Aid Report.

Maryland Water Monitoring Council Annual Conference (MWMC) – Staff attended the 31st annual conference for MWMC, and presented a poster titled “Practicality of Using eDNA to Assess Anadromous Herring Stream Spawning Habitat” (pictured below).



Practicality of Using eDNA to Assess Anadromous Herring Stream Spawning Habitat

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Maryland Department of Natural Resources, Fishing and Boating Services, Fisheries Ecosystem Assessment Division



Background
Stream Ichthyoplankton (IP) surveys have been the standard for determining combined presence of Herring (Alevife, Blueback Herring, and Hickory Shad) eggs or larvae in non-tidal streams¹. Recent environmental DNA (eDNA) studies detected Herring species² and evaluated relative abundance of Herring in non-tidal streams of the Chesapeake Bay region³. To supplement a long running Stream IP sampling program in Mattawoman Creek, we collected eDNA samples in tandem with 2025 Stream IP sampling to evaluate proportion of samples with Herring eggs or larvae (P_{Herr}) and to determine practicality of this method for sampling anadromous Herring spawning habitat.

Objectives:
1. Use eDNA to differentiate three species of Herring and determine spatiotemporal use of spawning habitat.
2. Determine if P_{Herr} from eDNA (presence of eDNA from at least one of the three species) can duplicate Stream IP.

Methods
Collection of eDNA samples occurred weekly at four sites in Mattawoman Creek during March-May, 2025 with a Smith-Root eDNA sampler that filtered 2.0 liters of water with 5.0 μ m self-preserving filters. The eDNA samples were sent to Jonah Ventures for metabarcoding processing. Stream IP samples at each site were collected using a 360-micron mesh net attached to a square frame held on the bottom in the current for five minutes. Samples were preserved for lab processing. P_{Herr} was calculated from Stream IP samples, the average of eDNA presence, and weighted average of eDNA presence.









SPECIES OF INTEREST



Map of sampling sites on Mattawoman Creek
(E) Map of sampling sites on Mattawoman Creek with corresponding conductivity measurements from the stream (i.e. Alewife, Blueback Herring, Hickory Shad) at (F) MC1, (G) MC2, (H) MC3, and (I) MC4 in 2025.

Conclusions

1. Estimates of P_{Herr} for Stream IP and eDNA sampling were similar based on 90% confidence intervals.
2. eDNA results allowed for identification of Herring to species level.
3. Alewife migrated the furthest upstream, followed by Hickory Shad then Blueback Herring.
4. Timing of migration followed previously established patterns for these anadromous species (Alewife first, Hickory Shad second, Blueback Herring last).
5. Variations of estimates of P_{Herr} between 2024 and 2025 may be a response to conductivity fluctuations (i.e., road salt, pictured below) in Mattawoman Creek. A negative response by anadromous fish to conductivity has been determined from combined data from nine streams sampled during 2005-2024⁴.





Literature Cited

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Thank you to the MDNR Freshwater Fisheries Division for use of their eDNA sampler and consulting on prior eDNA sampling experience.
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Future Considerations

1. Develop a cost analysis for Stream IP sampling versus eDNA sampling. How do the costs compare?
2. What does the historical data have to say about spawning migration and habitat use?
3. Is water quality having an impact on the spatiotemporal use of spawning habitat by the three Herring species?

Webinars, Meetings, etc.

Staff participated in an internal FABS meeting on planning for climate and environmental change.

Staff listened in on ASMFC Striped Bass and Menhaden meetings.

Staff participated in an American Fisheries Society “higher-level thinking” webinar, where they learned strategies for employing critical thinking techniques in fisheries management scenarios.

Staff attended the DNR invasive species matrix team (ISMT) meeting.

Staff met with DNR and MDE environmental review staff about a memorandum of understanding (MOU) for review of proposed projects or activities that may impact anadromous fish spawning habitat and require time of year restrictions. The MOU would also provide a

trigger for passing projects on to DNR for review early in the process when changes should be easier to make. Follow-up meetings were held within FEAD and with DNR's environmental review staff to identify the triggers for non-tidal and tidal waters.

Looking Forward

Staff will continue to work with Cooperative Oxford Lab to examine stomach contents of adult Striped Bass.

Staff will continue data analysis for the 2025 Federal Aid Report.

Staff will continue examining gut contents of larval Striped Bass and White Perch.

Seasonal Zophia Galvan's contract concludes on December 2.